

## Contributors to This Issue

**Anthony S. Acampora**, B.S.E.E., 1968, M.S.E.E., 1970, Ph.D., 1973, Polytechnic Institute of Brooklyn; Bell Laboratories, 1968—. Mr. Acampora initially worked in the fields of high power microwave transmitters and radar system studies and signal processing. Since 1974, he has been studying high capacity digital satellite systems. His current research interests are modulation and coding theory, time division multiple access methods, and efficient frequency re-use techniques. Member Eta Kappa Nu, Sigma Xi, IEEE.

**James L. Blue**, A.B., 1961, Occidental College; Ph.D., 1966, California Institute of Technology; Bell Laboratories, 1966—. Mr. Blue has done research in noise theory for avalanche diodes and in modeling of semiconductor devices, and was involved in the development of computer aids for testing of integrated circuits. He is now a member of the Computing Mathematics Research Department, where he is involved in mathematical modeling, research in numerical methods, and the development of numerical software.

**H. J. Braun**, Bell Laboratories, 1941—. Mr. Braun has worked on the development of the solderless wrapped connection and automatic machine wiring, and on the design of equipment for semiconductor fabrication. He is currently engaged in the mechanical design and packaging of opto-isolators.

**Fan R. K. Chung**, B.S., 1970, National Taiwan University; Ph.D., 1974, University of Pennsylvania; Bell Laboratories, 1974—. Mrs. Chung's current interests include combinatorics, graph theory, and the analysis of algorithms. She is presently investigating various problems in the theory of switching networks.

**Ronald E. Crochiere**, B.S., (E.E.) 1967, Milwaukee School of Engineering; M.S. (E.E.), 1968, Ph.D. (E.E.), 1974, Massachusetts Institute of Technology; Raytheon Co., 1968–1970; Bell Laboratories, 1974—. Mr. Crochiere is presently engaged in research activities in speech communications, speech coding, and digital signal processing. Member, IEEE, Sigma Xi, ASSP-DSP Subcommittee.

**Bruce R. Davis** B.E., 1960, B.Sc., 1963, Ph.D., 1969, University of Adelaide, Australia. Mr. Davis has been with the University of Adelaide since 1964 and at present is a Senior Lecturer in Electrical Engineering. His research interests are in the field of communication systems. During 1970 he was with Bell Laboratories, Holmdel, New Jersey, studying various aspects of mobile radio communications, and again in 1977 when he was involved in satellite systems research. Member, IEEE.

**A. Ross Eckler**, B.A., 1950, Swarthmore College; Ph.D., 1954, Princeton University; Bell Laboratories, 1954—. For much of his Bell Laboratories career, Mr. Eckler worked on a variety of probabilistic models in the military area, particularly missile guidance codes, target coverage, and anti-ballistic missile allocation; since 1972, he has consulted on a number of statistical problems in Bell System operations, including subject-matter fields such as building fires, investment tax credit on new construction, equal employment opportunity, and outside plant cable installation. He is currently Head of the Common Systems Analysis Department, and a member of Sigma Xi, Phi Beta Kappa, and the American Statistical Association.

**A. G. Fraser**, B.Sc. (aero. engin.), 1958, Bristol University; Ph.D. (computing science), 1969, Cambridge University; Bell Laboratories, 1969—. Mr. Fraser has been engaged in computer and data communications research. His work includes the Spider network of computers and a network-oriented file store. Prior to joining Bell Laboratories, he was at Cambridge University where he wrote the file system for the Atlas 2 computer. In 1977 he was appointed Head, Computer Systems Research Department. Member, IEEE, ACM, British Computer Society.

**B. Gopinath**, M.Sc. (Math.), 1964, University of Bombay; Ph.D. (E.E.) 1968, Stanford University; research associate, Stanford University, 1967–1968; Alexander von Humbolt research fellow, University of Göttingen, 1971–1972; Bell Laboratories, 1968—. Mr. Gopinath is engaged in applied mathematics research in the Mathematics and Statistics Research Center.

**Akira Hasegawa**, B.S., M.S., Osaka University; Ph.D., 1964, University of California, Berkeley; Associated Professor, Osaka University, 1964–1968; Bell Laboratories, 1968—. Mr. Hasegawa's primary fields

of interest are plasma physics, space physics, nonlinear optics, and fluid dynamics. Since 1971, he has been serving as Adjunct Professor at Columbia University. He is a Fellow of American Physical Society, Senior Member, IEEE and Member, American Geophysical Union, Physical Society of Japan, and Sigma Xi.

**Frank K. Hwang**, B.A., 1960, National Taiwan University; M.B.A., City University of New York; Ph.D. (Statistics), 1968, North Carolina State University; Bell Laboratories, 1967—. Mr. Hwang spent the fall of 1970 visiting the Department of Mathematics of National Tsing-Hua University. He has been engaged in research in statistics, computing science, discrete mathematics, and switching networks.

**John C. Irvin**, B.A., 1949, Miami University (Ohio); M.A., 1953, Ph.D. (Physics), 1957, University of Colorado; Bell Laboratories, 1957—. Mr. Irvin has engaged in research on the properties of bulk Si and diffused layers in Si and on Si interfaces. He has been involved in the development of microwave semiconductor devices including GaAs varactors, mixer diodes, Gunn diodes, IMPATT diodes, and most recently the reliability aspects of the GaAs FET. Senior member, IEEE; member, American Physical Society, Sigma Xi, and Phi Beta Kappa.

**Andrew S. Jordan**, B.S. (Metallurgy), 1959, Pennsylvania State University; Ph.D. (Metallurgy), 1965, University of Pennsylvania; Bell Laboratories, 1965—. Mr. Jordan has worked mainly in the area of compound semiconductors. He had been involved in the growth, phase equilibria, and impurity incorporation of ZnTe, CdTe, GaP, and GaAs. More recently, he has studied the degradation and reliability of GaP LEDs. Currently, he is engaged in modeling GaAs crystal growth. Member, Electrochemical Society.

**T. C. Liang**, B.S. (math.), 1972, and M.S. (applied math.), 1976, National Tsing-Hua University; Telecommunication Laboratories, 1976—. Mr. Liang has been engaged in research in statistics and switching networks.

**A. Loya**, Assoc. E.E., 1955, Pennsylvania State College, U.S.N. 1955–1959, Bell Laboratories, 1960—. Mr. Loya has worked on developing transistor fabrication, Si interfaces involving dry oxides (MOS),

IMPATT diodes, and BARITT diodes, and is presently working on the reliability and stress aging of the GaAs FET.

**Barbara J. McDermott**, B.A. (Psychology), 1949, University of Michigan; M.A. (Psychology), 1963, Columbia University; Haskins Laboratories, 1950–1959; Bell Laboratories, 1959—. Ms. McDermott has worked on speech quality evaluation and multidimensional scaling analysis. Member, Acoustical Society of America.

**Carol A. McGonegal**, B.S. (cum laude) (mathematics), 1974, Fairleigh Dickinson University; M.S. (computer science), 1977, Stevens Institute of Technology; Bell Laboratories, 1967—. Ms. McGonegal is a member of the Acoustics Research Department, where she has worked on problems in digital filter design, digital speech processing, computer voice response, and speaker verification.

**James P. Moreland**, B.S.E.E., 1964; M.S.E.E., 1964; Ph.D. (E.E.), 1967, Ohio State University; Research Associate, Electroscience Laboratory, 1964–1968, Instructor, Electrical Engineering, 1967–1968, both Ohio State University; Bell Laboratories, 1968—. At Ohio State, Mr. Moreland worked on studies of scattering theory and optical heterodyne detection. At Bell Laboratories, he has been concerned with clock-synchronization schemes for digital communications networks, optical-fiber transmission studies, and traffic and facility network planning. Member, IEEE, Eta Kappa Nu, Tau Beta Pi, and Sigma Xi.

**John A. Morrison**, B.Sc., 1952, King's College, University of London; Sc.M., 1954, and Ph.D., 1956, Brown University; Bell Laboratories, 1956—. Mr. Morrison has done research in various areas of applied mathematics and mathematical physics. He has recently been interested in queuing problems associated with data communications networks. He was a Visiting Professor of Mechanics at Lehigh University during the fall semester, 1968. Member, American Mathematical Society, SIAM, IEEE, Sigma Xi.

**F. W. Mounts**, E.E., 1953, M.S., 1956, University of Cincinnati; Bell Laboratories, 1956—. Mr. Mounts has been concerned with research in efficient methods of encoding pictorial information for digital television

and graphics systems. Member, Eta Kappa Nu; Senior Member, IEEE.

**Arun N. Netravali**, B. Tech. (Honors), 1967, Indian Institute of Technology, Bombay, India; M.S., 1969, and Ph.D. (E.E.), 1970, Rice University; Optimal Data Corporation, 1970–1972; Bell Laboratories, 1972—. Mr. Netravali has worked on problems related to filtering, guidance, and control for the space shuttle. At Bell Laboratories, he has worked on various aspects of signal processing. He is presently Head of the Visual Communication Research Department. He has been on the adjunct faculty at Rutgers University since 1976. Member, Tau Beta Pi, Sigma Xi; Senior Member, IEEE.

**Kun I. Park**, B.S., 1966, Seoul National University; M.S., 1968, Ph.D., 1972, University of Pennsylvania; Bell Laboratories, 1973—. Mr. Park has worked primarily on transmission performance objectives and requirements for public and private telephone networks. Member, IEEE, Sigma Xi.

**Robert H. Peaker**, Associate in Applied Science, 1964, Lowell Institute; B.S. (E.E.), 1976, New Jersey Institute of Technology; Bell Laboratories, 1967—. Mr. Peaker has been engaged in experimental work on electroluminescent materials and devices. He is currently working on electroluminescent device reliability.

**Lawrence R. Rabiner**, S.B. and S.M., 1964, Ph.D. (electrical engineering), Massachusetts Institute of Technology; Bell Laboratories, 1962—. From 1962 through 1964, Mr. Rabiner participated in the cooperative plan in electrical engineering at Bell Laboratories. He worked on digital circuitry, military communications problems, and problems in binaural hearing. Presently he is engaged in research on speech communications and digital signal processing techniques. He is coauthor of *Theory and Application of Digital Signal Processing* (Prentice-Hall, 1975). Former President, IEEE G-ASSP Ad Com; former Associate Editor, G-ASSP Transactions; former member, Technical Committee on Speech Communication of the Acoustical Society. Member, G-ASSP Technical Committee on Speech Communication, IEEE Proceedings Editorial Board, Eta Kappa Nu, Sigma Xi, Tau Beta Pi. Fellow, Acoustical Society of America and IEEE.

**Robert H. Saul**, Ph.D. (Metallurgy and Materials Science), 1967, Carnegie-Mellon University; Bell Laboratories, 1967—. Mr. Saul worked on the growth, fabrication, and characterization of III-V semiconductor LEDs for a variety of opto-electronic devices. More recently, he has been involved with reliability of opto-electronic devices. He is supervisor of the Device Reliability and Electroluminescent Materials Group. Member, Electrochemical Society, Sigma Xi, and Tau Beta Pi.

**Irwin W. Sandberg**, B.E.E., 1955, M.E.E., 1956, and D.E.E., 1958, Polytechnic Institute of Brooklyn; Bell Laboratories, 1958—. Mr. Sandberg has been concerned with analysis of radar systems for military defense, synthesis and analysis of active and time-varying networks, several fundamental studies of properties of nonlinear systems, and with some problems in communication theory and numerical analysis. His more recent interests include macroeconomics and the economic theory of large corporations. Fellow and member, IEEE; member, American Association for the Advancement of Science, Eta Kappa Nu, Sigma Xi, and Tau Beta Pi.

**Harry H. Wade**, Associate (Electronic Technology), 1964, Philco Technical Institute; Bell Laboratories, 1965—. Mr. Wade has worked in the development of solid-state microwave power sources (IMPATT, TRAPATT). He is currently engaged in development of the linear opto-isolator.

**Kenneth A. Walsh**, A.A.S. (E.E.), Kent State University, Salem, Ohio, 1969; Bell Laboratories, 1969—. Mr. Walsh's work has been mainly concerned with the investigation of efficient digital coding techniques, using both hardware and software methods, with application to video and facsimile transmissions.